CLAIMS

What is claimed is:

1. A method to look up a plurality of data items indexed by a vector of indices, the method comprising:
generating a second vector of indices in a vector register, each index of the second vector of indices being one of a first vector of indices, at least one index in the first vector of indices being replicated as a plurality of duplicated indices in the second vector of indices; and
looking up simultaneously a first vector of data items from a plurality of look up tables using the second vector of indices.

2. A method as in claim 1 wherein the plurality of duplicated indices in the second vector of indices are grouped together for looking up respectively a plurality of bit segments of one data item in the first vector of data items.

3. A method as in claim 2 wherein the second vector is generated by at least one of:
a) a vector merge operation; and
b) a vector permutation operation.

4. A method as in claim 1 wherein a group of indices in the first vector of

indices is replicated as a plurality of duplicated groups of indices in the second vector of indices.

5. A method as in claim 4 wherein the second vector of indices is generated by a vector permutation operation.

6. A method as in claim 4 further comprising:
storing a plurality of groups of data items in the first vector of data items into different vectors respectively, the plurality of groups of data items being looked up using the plurality of duplicated groups of indices respectively.

7. A method to look up a plurality of data items indexed by a plurality of vectors of indices, the method comprising:
generating a second vector of indices in a vector register, each index of the second vector being one index of a plurality of vectors of indices, at least one index in each vector of the plurality of vectors of indices being replicated as an index in the second vector; and
looking up simultaneously a first vector of data items from a plurality of look up tables using the second vector of indices.

8. A method as in claim 7 wherein at least one index in one vector of the plurality of vectors of indices are replicated as a plurality of duplicated

indices in the second vector.

9. A method as in claim 8 wherein the plurality of duplicated indices in the second vector of indices are grouped together for looking up respectively a plurality of bit segments of one data item in the first vector of data items.

10. A method as in claim 7 wherein a group of indices in each vector of the plurality of vectors of indices are replicated respectively as a group of indices in the second vector of indices.

11. A method as in claim 10 further comprising:
storing a plurality of groups of data items in the first vector of data items into different vectors respectively, each of the plurality of groups of data items being looked up using a group of indices in the second vector of indices which is replicated from a group of indices in one vector of the plurality of vectors of indices.

12. A machine readable media containing executable computer program instructions which when executed by a digital processing system cause said system to perform a method to look up a plurality of data items indexed by a vector of indices, the method comprising:
generating a second vector of indices in a vector register, each index of the second vector of indices being one of a first vector of indices, at least

one index in the first vector of indices being replicated as a plurality of duplicated indices in the second vector of indices; and

looking up simultaneously a first vector of data items from a plurality of look up tables using the second vector of indices.

13. A media as in claim 12 wherein the plurality of duplicated indices in the second vector of indices are grouped together for looking up respectively a plurality of bit segments of one data item in the first vector of data items.

14. A media as in claim 13 wherein the second vector is generated by at least one of:

a) a vector merge operation; and

b) a vector permutation operation.

15. A media as in claim 12 wherein a group of indices in the first vector of indices is replicated as a plurality of duplicated groups of indices in the second vector of indices.

16. A media as in claim 15 wherein the second vector of indices is generated by a vector permutation operation.

17. A media as in claim 15 wherein the method further comprises:

storing a plurality of groups of data items in the first vector of data items into

different vectors respectively, the plurality of groups of data items being looked up using the plurality of duplicated groups of indices respectively.

18. A machine readable media containing executable computer program instructions which when executed by a digital processing system cause said system to perform a method to look up a pluralities of data items indexed by a plurality of vectors of indices, the method comprising:

generating a second vector of indices in a vector register, each index of the second vector being one index of a plurality of vectors of indices, at least one index in each vector of the plurality of vectors of indices being replicated as an index in the second vector; and

looking up simultaneously a first vector of data items from a plurality of look up tables using the second vector of indices.

19. A media as in claim 18 wherein at least one index in one vector of the plurality of vectors of indices are replicated as a plurality of duplicated indices in the second vector.

20. A media as in claim 19 wherein the plurality of duplicated indices in the second vector of indices are grouped together for looking up respectively a plurality of bit segments of one data item in the first vector of data items.

21. A media as in claim 18 wherein a group of indices in each vector of the plurality of vectors of indices are replicated respectively as a group of indices in the second vector of indices.

22. A media as in claim 21 wherein the method further comprises:
storing a plurality of groups of data items in the first vector of data items into different vectors respectively, each of the plurality of groups of data items being looked up using a group of indices in the second vector of indices which is replicated from a group of indices in one vector of the plurality of vectors of indices.

23. A processing system to look up a plurality of data items indexed by a vector of indices, the system comprising:
means for generating a second vector of indices in a vector register, each index of the second vector of indices being one of a first vector of indices, at least one index in the first vector of indices being replicated as a plurality of duplicated indices in the second vector of indices; and
means for looking up simultaneously a first vector of data items from a plurality of look up tables using the second vector of indices.

24. A processing system as in claim 23 wherein the plurality of duplicated

indices in the second vector of indices are grouped together for looking up respectively a plurality of bit segments of one data item in the first vector of data items.

25. A processing system as in claim 24 wherein the second vector is generated by at least one of:
a) a vector merge operation; and
b) a vector permutation operation.

26. A processing system as in claim 23 wherein a group of indices in the first vector of indices is replicated as a plurality of duplicated groups of indices in the second vector of indices.

27. A processing system as in claim 26 wherein the second vector of indices is generated by a vector permutation operation.

28. A processing system as in claim 26 further comprising:
means for storing a plurality of groups of data items in the first vector of data items into different vectors respectively, the plurality of groups of data items being looked up using the plurality of duplicated groups of indices respectively.

29. A processing system to look up a pluralities of data items indexed by a

plurality of vectors of indices, the system comprising:

means for generating a second vector of indices in a vector register, each index of the second vector being one index of a plurality of vectors of indices, at least one index in each vector of the plurality of vectors of indices being replicated as an index in the second vector; and

means for looking up simultaneously a first vector of data items from a plurality of look up tables using the second vector of indices.

30. A processing system as in claim 29 wherein at least one index in one vector of the plurality of vectors of indices are replicated as a plurality of duplicated indices in the second vector.

31. A processing system as in claim 30 wherein the plurality of duplicated indices in the second vector of indices are grouped together for looking up respectively a plurality of bit segments of one data item in the first vector of data items.

32. A processing system as in claim 29 wherein a group of indices in each vector of the plurality of vectors of indices are replicated respectively as a group of indices in the second vector of indices.

33. A processing system as in claim 32 further comprising:

means for storing a plurality of groups of data items in the first vector of data

items into different vectors respectively, each of the plurality of groups of data items being looked up using a group of indices in the second vector of indices which is replicated from a group of indices in one vector of the plurality of vectors of indices.

34. A processing system to look up a plurality of data items indexed by a vector of indices, the system comprising:

a vector register file comprising a plurality of vector registers;

a vector processing unit coupled to the vector register file, the vector processing unit comprising a vector look up unit adapted to look up a vector of data items simultaneously, the vector processing unit:

generating a second vector of indices in a vector register in the vector register file, each index of the second vector of indices being one of a first vector of indices, at least one index in the first vector of indices being replicated as a plurality of duplicated indices in the second vector of indices; and

looking up simultaneously a first vector of data items from a plurality of look up tables using the second vector of indices in the vector look up unit.

35. A processing system as in claim 34 wherein the plurality of duplicated indices in the second vector of indices are grouped together for looking up respectively a plurality of bit segments of one data item in the first vector of data items.

36. A processing system as in claim 35 wherein the second vector is generated by the vector processing unit executing at least one of:
a) a vector merge operation; and
b) a vector permutation operation.

37. A processing system as in claim 34 wherein a group of indices in the first vector of indices is replicated as a plurality of duplicated groups of indices in the second vector of indices.

38. A processing system as in claim 37 wherein the second vector of indices is generated by a vector permutation operation.

39. A processing system as in claim 37 wherein the vector processing unit stores a plurality of groups of data items in the first vector of data items into different vectors respectively, the plurality of groups of data items being looked up using the plurality of duplicated groups of indices respectively.

40. A processing system to look up a pluralities of data items indexed by a plurality of vectors of indices, the system comprising:
a vector register file comprising a plurality of vector registers;
a vector processing unit coupled to the vector register file, the vector processing unit comprising a vector look up unit adapted to look up a

vector of data items simultaneously, the vector processing unit:

generating a second vector of indices in a vector register in the register file, each index of the second vector being one index of a plurality of vectors of indices, at least one index in each vector of the plurality of vectors of indices being replicated as an index in the second vector; and

looking up simultaneously a first vector of data items from a plurality of look up tables using the second vector of indices in the vector look up unit.

41. A processing system as in claim 40 wherein at least one index in one vector of the plurality of vectors of indices are replicated as a plurality of duplicated indices in the second vector.

42. A processing system as in claim 41 wherein the plurality of duplicated indices in the second vector of indices are grouped together for looking up respectively a plurality of bit segments of one data item in the first vector of data items.

43. A processing system as in claim 40 wherein a group of indices in each vector of the plurality of vectors of indices are replicated respectively as a group of indices in the second vector of indices.

44. A processing system as in claim 43 wherein the vector processing unit stores a plurality of groups of data items in the first vector of data items into different vectors respectively, each of the plurality of groups of data items being looked up using a group of indices in the second vector of indices which is replicated from a group of indices in one vector of the plurality of vectors of indices.